Economy and Environment Program
for Southeast Asia
22 Cross Street #02-55
South Bridge Court
Singapore 048421

Phone: (65) 6438 7877
Fax: (65) 6438 4844
E-mail: hfrancisco@idrc.org.sg
Web site: www.eepsea.org

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA-supported research projects, as presented in detail in *EEPSEA Research Reports*.

EEPSEA Policy Briefs and Research Reports are available online at http://www.eepsea.org

When Wetland Conservation Works – an Assessment from Lao PDR

EEPSEA POLICY BRIEF • No. 2008-PB6

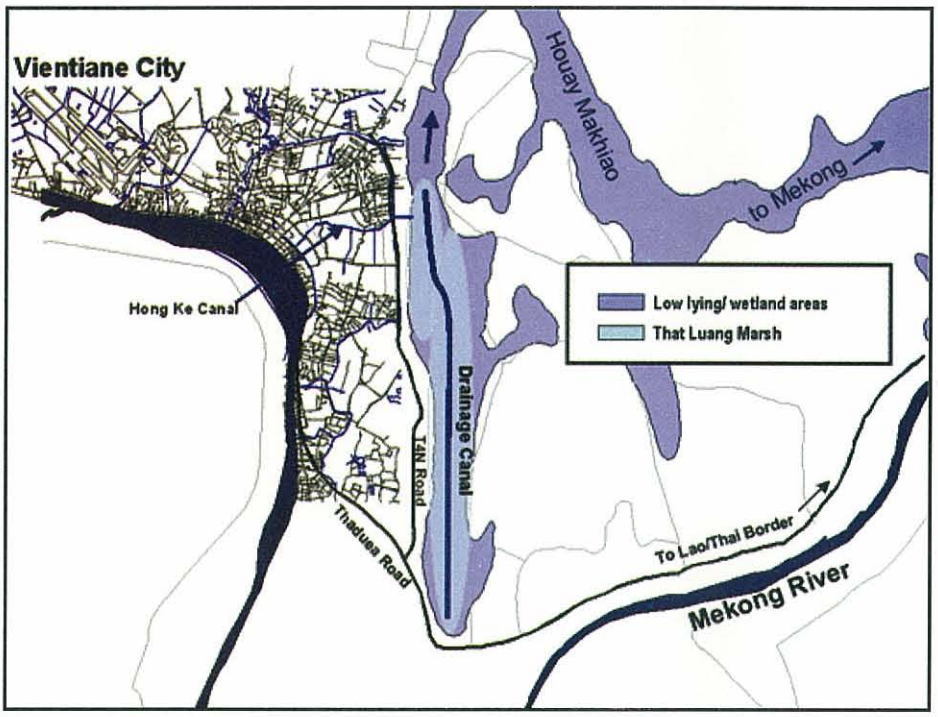
Wetlands are among the most important habitats for wildlife in the world. However, across Southeast Asia many wetland areas are under threat from water extraction and a range of other development pressures. Now, a new EEPSEA study from the People's Democratic Republic of Laos has shown that conserving wetlands →

A summary of EEPSEA research report 2008-RR6, 'The Impact of Irrigation on Aquatic Wetland Resources – A Case Study of That Luang Marsh, Lao PDR' by Mr. Phouphet Kyophilavong, c/o Faculty of Economics and Business Management, National University of Laos. P.O. Box 7322, Vientiane, Lao PDR. E-mail: Phouphet20007@ hotmail.com

"the conservation of the marsh ...

→ can provide significant economic benefits. The report is the work of Phouphet Kyophilavong from the Faculty of Economics and Business Management at the National University of Laos. It looks at That Luang Marsh (TLM) near Vientiane, the country's capital city.

Phouphet finds that the economic benefits provided by the marsh (particularly in terms of the fish and other aquatic resources it supplies to local people) far outweigh the benefits provided by the extraction of its water for rice cultivation. As this water extraction is threatening the ecology of the marsh, the report recommends that less water should be taken from TLM. Phouphet shows that this course of action would, on balance, improve the livelihoods of local people. To make sure that no one would be adversely affected by such a conservation policy, the report makes a series of recommendations for how rice farmers (who would have their supplies of irrigation water reduced) could be helped to make a sustainable living that does not have a negative impact on the marsh.



Map showing VC and That Luang Marsh

The Wetland Challenge

That Luang Marsh is an urban wetland that plays an important role in the lives of Vientiane residents. The wetland system combines freshwater, marsh, seasonally flooded grasslands and shrub lands. It covers an area of around 16 square km, and collects water that drains from Vientiane and its surrounding suburban areas. TLM serves as a natural breeding ground for fish and other edible animals. Collecting animals and vegetation from the marsh helps feed and support local residents, particularly the landless communities that live round its edges. As well as providing food to local people the TLM also provides valuable ecosystem services to Vientiane, including wastewater purification and flood protection.

There are 17 villages around the TLM area. These house about 43,500 people in 7,731 households. This represents about 6% of the total population of Vientiane. The number of people living around the marsh has risen dramatically from just over 2,000 households in the early 1990s to more than 7,000 in 2006. This growth in population has brought a whole range of development pressures to the area, including wastewater and solid waste contamination, land conversion and water extraction for irrigation.

These pressures have caused a drastic change to the social and physical environment of TLM. In 1975, TLM was two to three times bigger than it is today and its water and biodiversity levels were also much higher. It is clear that current laws are not adequate to conserve the ecology of TLM, and that the marsh is threatened and needs more protection.

Assessing the Impact of Irrigation

Of the problems facing the TLM, irrigation for rice cultivation is one of the most important. The total rice-growing area in TLM is 1,434 ha. During the dry season, demand for water for this rice exceeds the available water supply from the marsh and this leads to its water levels going down. In turn this damages the ecology of the marsh and hurts fish stocks. Unsurprisingly this has led to conflict between farmers and

makes good economic sense"

fisher folk in the TLM area.

The main objective of Phouphet's study was to look at the impact of this extraction of water. This was done by first assessing both the financial benefits of irrigated rice farming and the financial benefits provided by the marsh itself. Using this information, an assessment was then made of the financial impact of conserving the marsh by reducing the amount of water extracted from it for irrigation.

To get the information necessary for this work, data was gathered from numerous government and international agencies. This information included details of irrigation, wetland management, aquatic wetland resources, water and land use and the socio-economic makeup of households. Primary data was also gathered using a survey of 317 households in the 17 villages located around TLM. The household survey covered two target household groups: the rice cultivators and landless villagers, both of whom catch fish and non-fish animals and collect vegetation from the wetland.

Which is More Important, Rice or Fish?

The benefits of irrigation were assessed by first doing a cost-benefit assessment of rice production. The costs of rice production were divided into four categories: irrigation cost; material input cost (seeds, fertilizers and pesticides); labor cost; and capital cost (machines, land and transportation). These were calculated alongside the financial gains that people make from selling rice. These gains were worked out using data on rice yields, rice production areas and the price of the rice crop.

Although TLM provides many financial and ecological benefits to local people, the study focused on its 'direct use' value in terms of the fish, other animals and vegetation that local people collect from it. In the 17 villages, 23% of the households catch fish during the rainy season, and 14% do it during the dry season. About 31% catch other animals from the marsh during the rainy season and 3% do it during the dry season. There are 1,131 households that collect vegetation during the rainy season and 698 households that harvest vegetation during the dry season.

In the rainy season, the highest net benefit per household comes from catching fish and non-fish animals. This amounts to US$241.05 per household. Rice cultivation provides US$184.82 per household and collecting vegetation US$111.80. During the dry season, the net benefit from rice cultivation is the highest (US$186.14 per household), followed by catching fish and other animals (US$60.76 per household). Vegetation collection provides US$50.02 per household. This indicates that the main source of income for the sampled households is catching fish during the rainy season and rice cultivation during the dry season.

Total direct net benefits from TLM

Source of income	Rainy season		Dry season		Total	
	1000 US $	%	1000 US $	%	1000 US $	%
Irrigation						
Rice cultivation	86.33	7.11	106.98	18.05	193.30	10.70
AWR						
Fish and non-fish	1,002.04	82.48	68.7	11.60	1,071	59.24
Aquaculture	-		382.0	64.46	382	21.13
Vegetation	126.45	10.41	34.9	5.89	161	8.93
Sub-total	1,128.49	92.89	485.6	81.95	1,614	89.30
TOTAL	1,214.82	100.00	592.6	100.00	1,807	100.00

Sources: field survey by author in 2007, village statistis and interviews with key informants

The Economics of Wetland Conservation

Overall, the study finds that the marsh is the most important source of income in TLM, with a share of 89.3%. Within this, catching fish and non-fish animals accounts for 59.24%, aquaculture for 21.13%, rice cultivation for 10.7% and vegetation collection for 8.93%. This result indicates that the resources harvested from TLM are more critical than rice cultivation to the livelihoods of TLM communities.

Once the financial benefits provided by rice cultivation and by TLM's wetland resources were calculated, it was possible to assess the economic impact of conserving the marsh by reducing the amount of water extracted from it. According to the fishery experts from LARReC (the Living Aquatic Resources Research Center), the minimum water level requirement for TLM should be 0.5 m. According to the experts, this would allow the main fish species in the area to live and breed. Based on this water level target, it is clear that the water level in TLM often falls below an acceptable level. For example, it

fell short in the months from February to April 2007. Water level readings during this period were 0.42 m for February, 0.38 m for March and 0.21 m in April, which was the lowest water level in TLM for that year.

Phouphet found that, if the minimum water level requirement in TLM were set at 0.5 m during the dry season, the total rice output in TLM would decrease by 20.3%. This would cause farmers a loss of about US$ 21.72 thousand. On the other hand, the revenue from resource collection in the marsh would increase by 10%. This would be worth US$ 48.56 thousand. It is therefore clear that, from an economic perspective, returning water levels in the marsh to an ecologically sustainable level makes good economic sense.

Making Conservation Work

The results show that implementing a program to conserve TLM by reducing the amount of water available for irrigation would have an overall positive financial impact on local people's livelihoods. This means that policy-makers should give priority to the conservation of TLM's aquatic environment in their water distribution decisions. To date, there have been no clear water allocation rules and regulations for conservation and rice cultivation in TLM. In order to maintain both, Phouphet recommends that policy makers should consider setting a minimum water level for TLM. He suggests that this should be set at the basic threshold level recommended by fishery experts. This should ensure the conservation of TLM's precious wetland ecosystem.

Effective wetland management requires reliable statistics and information on factors such as wetland resources, land transformation and water usage. However, it is clear that the relevant government agencies in Laos have overlooked this requirement up until now. Phouphet recommends that they should pay more attention to collecting and analyzing critical data before any plans for the wetlands are implemented.

This study also finds that local farmers' knowledge about the best use of irrigation water is poor and that the available water in the TLM region could be more effectively used. In order to improve this situation, Phouphet recommends that more training on water use and alternative crops (that need less water than rice) should be provided to the rice farmers of TLM. The main and small irrigation canals should also be improved and a more equitable distribution system of irrigation water developed. Such moves would help farmers to cope with any conservation measures that would reduce the amount of irrigation water they receive and, at the same time, reduce water extraction pressures on the marsh itself.

EEPSEA is administered by Canada's International Development Research Centre (IDRC) on behalf of EEPSEA's sponsors:

Sida

Canadian International Development Agency | Agence canadienne de développement international

IDRC CRDI